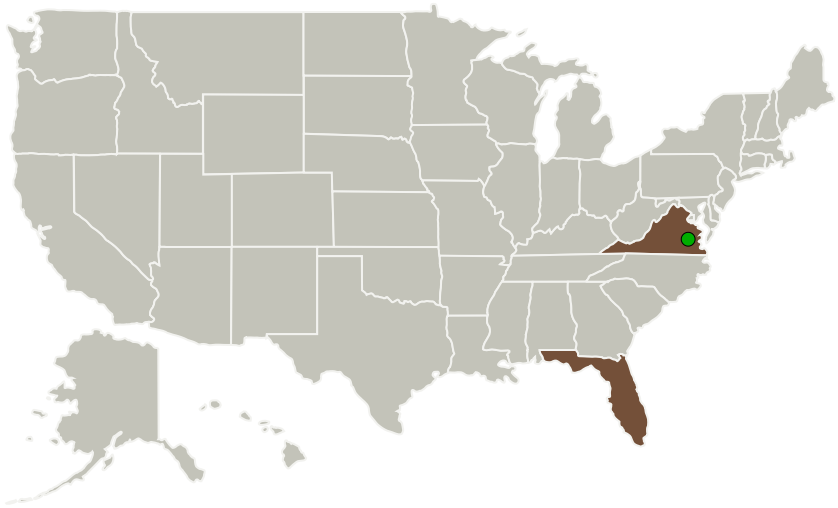
Wireless SAW Interrogator and Sensor System, Phase I

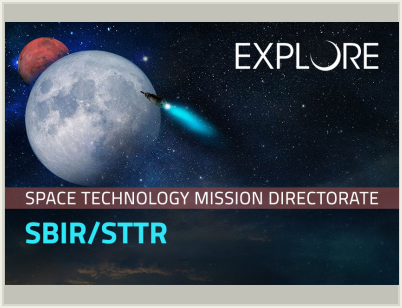
Completed Technology Project (2011 - 2011)

Project Introduction

Wireless, passive, Surface Acoustic Wave (SAW), Orthogonal Frequency Coded (OFC) temperature sensors, operating in a multi-sensor environment, developed at the University of Central Florida (UCF) have been successfully interrogated wirelessly at a distances ranging from 7 to 21 feet with a transceiver system developed by Mnemonics, Inc (MNI). The proposed innovation adds a coherent detection capability to the interrogator receiver, allowing the phase of the received signal to be measured. As is done in GPS signal processing, the phase information allows precise measurement of range (from the interrogator to sensor) as well as motion, and if multiple antennas are used, angle of arrival (i.e. direction) can also be sensed. The investigation will include optimizing waveforms for the new measurement capabilities and will extend the detection range well beyond the 21 feet. Other objectives are to develop a compact integrated sensor and antenna, synchronize timing and phase in a multiple interrogator network and improve RF performance on both the transmit and receive side of the interrogator. The proposed interrogator is based on a quadrature receiver technique and will also include wireless backhaul for instantaneous distribution of measurement data. The proposed interrogator and SAW sensors are to operate at the 915 MHz frequency band. The proposed system will be used in a broad range of NASA, as well as commercial applications.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Mnemonics, Inc.	Lead Organization	Industry	Melbourne, Florida
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Florida	Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138574)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mnemonics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

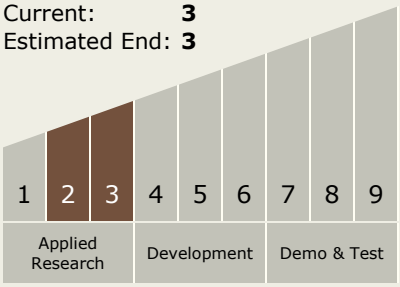
Carlos Torrez

Principal Investigator:

Nikolai Koalovski

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System